ICES work on the Roadmap for Offshore Renewable Energy (ORE) and ORE-related advice requests

1 Purpose

To update MIACO on implementation of the actions described in the ICES Roadmap for Offshore Renewable Energy, plans for 2025 delivery and progress with responding to ORE-related advice requests. To seek information from MIACO on other priorities related to ORE and fisheries interactions.

2 Background

The publication of the ICES Roadmap for Offshore Renewable Energy in 2024 marked a step-change in ICES commitment to work on Offshore Renewable Energy. This addressed the need for, and identification of, robust scientific evidence and appropriate assessment tools required to support marine spatial planning, and the evaluation of the trade-offs between sectors potentially affected by ORE developments and their potential impacts on marine ecosystems.

Delivery of Roadmap actions continued through 2024 and into 2025. In addition, ICES received (i) a wide-ranging DGMARE request for advice on the social and economic impacts of fast, large-scale ORE developments on the fisheries sector and the impacts of ORE on marine ecosystems and (ii) a Greater North Sea Basin Initiative (GNSBI) request for advice on cumulative impact assessment, including ways to evaluate planning scenarios of offshore wind and other human activities. Consequently, there is now a close interplay between science developments and support for advice on ORE in ICES, with many expert groups contributing work that spans science and development of the knowledge basis for advice.

3 Roadmap for Offshore Renewable Energy

The ICES Roadmap sets out four goals for the development science and evidence in relation to ORE within an ecosystem-based management framework:

1. Advance scientific capacity to support advice regarding the interactions among ORE developments and marine ecosystems.
2. Design and coordinate data collection networks at the range of spatial and temporal scales needed to monitor, assess, and predict the impacts of ORE developments on marine ecosystems.
3. Further the development and application of models, coordinated process studies, and long-term observations supporting ecosystem-based management and the analysis of impacts from ORE

developments on marine life, fishing activities, and coastal economies at regional and ecosystem scales and at sub-seasonal to decadal scales.

4. Develop frameworks that guide the use of best available information on the interactions of ORE, ecosystem functions and structure, and ecosystem services and provisions.

The goals informed the identification and prioritisation of four specific actions to be initiated during 2024/25:

1. To assess the trade-offs between ORE developments and other sectors.
2. To facilitate the coordination of research and data for the provision of regional assessments in support of national government and industry needs.
3. To develop and publish guidelines and standards for monitoring and assessment in the ORE sector.
4. To assess ORE developments on fishery independent surveys, fisheries management, and ICES recurrent stock advice.

To progress these priorities, a workshop (WKWIND) was convened in May 2024 to "develop ICES best practice guidelines on how to approach the ecological, economic and social trade-offs between offshore renewable energy developments and fisheries" https://doi.org/10.17895/ices.pub.28229543. The workshop mainly advanced Roadmap Actions 1 and 3 with a key outcome being the specification and development of an initial social ecological systems (SES) framework to identify trade-off interactions between ORE and fisheries, which compliments the existing ICES framework for ecosystem-informed science and advice (ICES Framework for Ecosystem-Informed Science and Advice).

WKWIND specifically considered:

a) The spatial and temporal boundaries of trade-offs to be assessed between fisheries and offshore wind farms.

b) Existing data and tools relevant to trade-off assessment using information provided by previous ICES workshops (e.g. Workshop on Small Scale Fisheries and Geo-Spatial Data 2 (WKSSFGEO2), Workshop on Stakeholder Input to Refine the Basis of Trade-Off Assessments Between the Impact of Fisheries on Sea-Floor Habitats and Their Landings and Economic Performance (WKD6STAKE), Workshop on Trade-offs between the Impact of Fisheries on Seafloor Habitats and their Landings and Economic Performance (WKTRADE4), Workshop to Update and Assess Trade-Offs Between the Impact of Fisheries on Seafloor Habitats and Their Landings and Economic Performance (WKD6ASSESS)).

c) The development of an approach that allows managers and stakeholders to explore the trade-offs between the extension of energy

provision and the provision of wild harvest fish and the respective ecological, economic and social consequences.

To further progress work against Priority Actions 2 and 4, two further workshops have been scoped and planned for 2025:

WKOMO – Workshop to scope harmonized regional monitoring schemes to assess the impact of offshore windfarms on fish, pelagic, benthic communities and ecosystem functions (26 – 28 May 2025).
The workshop will focus on (i) documenting existing and planned offshore wind monitoring and research programs at various scales, (ii) summarising which indicators of ecosystem state and function are routinely assessed, (iii) and recommend steps towards harmonised monitoring and assessment activities for the sector.

WKDSIM – Workshop to develop an ICES Survey Mitigation Strategy (23 – 27 June 2025).
The workshop will (i) describe and evaluate the effects of MPAs and ORE developments on long-term fishery independent surveys, (ii) the scientific and management approaches to be taken to mitigate potential impacts on surveys, stock assessments and fishing opportunities, and (iii) to develop a strategy to implement survey loss mitigate measures.

4 Advice requests

The ICES scientists engaging in ORE science and delivery of the objectives of the Roadmap for Offshore Renewable Energy (ORE) are increasingly in demand to provide the knowledge basis of ICES advice. ICES is currently addressing two advice requests linked to ORE. One request is from DGMARE (Annex 1), dealing with ORE directly, and one is from the Greater North Sea Basin Initiative (GNSBI) (Annex 2) on cumulative impact assessment (CIA) and deals in part with ORE impacts. Over 11 expert groups are providing scientists to contribute to the knowledge base to address these requests.

This section of the MIACO paper describes the content and timeline associated with these requests. The ICES advice on ORE to DGMARE will be released on 11 April 2025 and the advice to GNSBI on 5 November 2025.

4.1 DGMARE Request

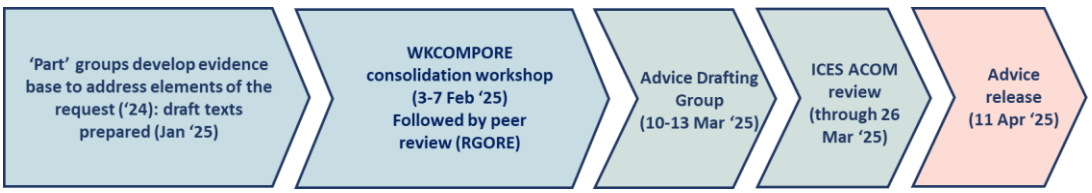
The DGMARE request sought advice on the social and economic impacts of fast large-scale ORE developments on the fisheries sector and the impacts of ORE on

marine ecosystems. It primarily relates to bottom-fixed offshore wind devices but evidence from floating wind and ocean energy (tidal, wave, etc.) will be considered when it provides important insights. Geographic scope is the Celtic Sea, Greater North Sea and Baltic Sea.

Briefly (further details in Annex 1), the advice will address (i) known and projected impacts, and methods that can be applied, for the analysis of economic and social impacts of ORE on the fisheries sector; and data and resources available to support, (ii) ecological impacts of ORE (at different stages of ORE development, i.e. survey, construction, operation, decommissioning) on commercially exploited fishes, (iii) methods to model cumulative impacts and impact mitigation, (iv) effects of changes in hydrodynamic conditions and cables on pelagic fishes, (v) options for mitigation measures, good practices, and spatial planning and (vi) research and monitoring priorities. Developing the knowledge base to address this wide-ranging request needs to draw on scientists from many disciplines and at least 11 ICES expert groups are thus engaged.

The timeline for addressing this request is as follows.

DGMARE request. Socio-economic impacts of ORE on fisheries and methodologies to model (cumulative) impacts in the Celtic Sea, Greater North Sea and Baltic Sea (ICES ecoregions).

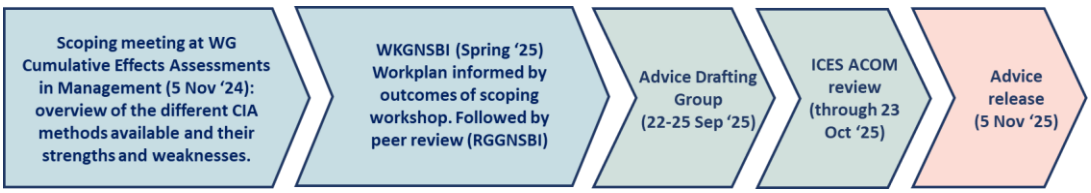


4.2 GNSBI Request

The GNSBI request (further details in Annex 2) will focus on methods, principles, application, knowledge base and recommendations for CIA to identify anthropogenic threats, evaluate planning scenarios for ORE and other human activities, inform MSP, and evaluate management measures and their effectiveness.

The timeline for addressing this request is as follows.

GNSBI request. Cumulative impact assessment (CIA).



Annex 1. Main elements of the advice request from DGMARE

(the full request is published on ICES website)

The main objective of this request is to understand better the socio-economic impacts of fast large-scale ORE developments on the fisheries sector.

The advice should concentrate on bottom-fixed offshore wind devices but evidence from floating wind and ocean energy (tidal, wave, etc.) can be considered where necessary.

The work will consist mainly of reviewing existing literature, but also of building recommendations and testing tools for the modelling of cumulative impacts.

ICES was requested to:

a) Assess data and resources available for the analysis of the economic[1] and social[2] impacts of ORE developments on the fisheries sector. On that basis:
b) Summarise the known and projected economic and social impacts of existing and planned offshore renewable developments (on fisheries, at metier and fleet levels). Trade-offs between negative economic impacts on fisheries and positive economic impacts of the ORE sector should be considered.
c) Describe sources of information available, methods that may be applied, and further data and information required, to address the economic and social impacts of ORE on fishers.
d) Summarise the known ecological impacts of ORE developments and their intensity (severe, medium, limited, unknown) on main commercial fish species3 for the areas listed above and at population levels (positive and negative impacts) looking at the different phases of ORE development (survey, construction, operation, decommissioning). A specific case study on the effects on recruitment of western Baltic herring and of the effects on harbour porpoises should be developed.
e) Provide recommendations for next steps to define methodologies to model cumulative impacts of offshore wind on commercial fisheries (temporary, permanent) and the possibility to adopt mitigation measures.
f) Provide a review, based on the most recent literature, to describe how changes on hydrodynamic conditions produced by ORE may change the food availability to filter-feeders and influence phytoplankton primary production.
g) Provide a review, based on the most recent literature, of the ways artificial structures could influence the colonization of new areas by species, both indigenous and non-indigenous species. Based on data available for other

[1] Focusing on economic impacts on fishers

[2] Identify priority impacts, but focus the assessment on employment of fishers

[3] species included in the ICES advice related to the EU request for advice on developing appropriate lists for Descriptor 3 (commercially exploited fish and shellfish) reporting by EU Member States under MSFD Article 17 in 2024.

structures (e.g. oil & gas), also from other locations (e.g. US), extrapolate how this colonization will affect ORE developments.

h) Provide a review, based on the most recent literature, of the ways in which pelagic species (especially commercial fish species) may react to dynamic cables suspended in the water column (floating wind).

i) List options for mitigation measures, good practices, and spatial planning for ORE developments and assess their strengths, weaknesses, implications and uncertainties. List priorities for research and monitoring related to these options.

Annex 2. Main elements of the advice request from GNSBI

(the full request is published on ICES website)

ICES is requested to help identify key pressures and cumulative impacts in the Greater North Sea and Celtic Seas and mitigate those through MSP decision making on a sea basin level.

a) Provide an overview of relevant cumulative impacts assessments (including those used within OSPAR, NSEC, ICES, relevant European research projects and national approaches) aimed at an applied setting and informing management decisions.

b) Define common principles for cumulative impacts assessments in relation to the expected applications and the types of management decisions that need to be informed on the Greater North Sea Basin level. Identify criteria for the evaluation of the available cumulative impacts assessments.

c) Provide recommendations for the application of the most suitable tool(s) for cumulative impact assessments on, at least, the Greater North Sea and Celtic Seas with the aim to answer the key questions conducted by the GNSBI WT-CIA (GNSBI work track on Cumulative Impact Assessment). Also include a process to further develop the required knowledge base with the aim to:
   - Identify the main anthropogenic threats that compromise the achievement of GES.
   - Evaluate planning scenarios of offshore wind and other human activities.
   - Inform MSP decision-making on a sea basin level.
   - Evaluate management measures aimed at mitigating human activities and their pressures.
   - Assess the effectiveness of the MSFD Program of Measures and the Natura 2000 Directive to reduce human-induced impacts.